

The *radiata* of Oneida Lake are not typical being more inflated, quadrate in outline rather than elliptical, the rays are not as even or as numerous and the color of the shell is usually yellowish rather than greenish, in this respect approaching *luteola*. The *radiata* type in the lake shows a decided variance toward the form of the shell herein described as *oneidensis*.

The only safe criterion for separating the Oneida Lake *radiata* from *luteola* is by the form of the cardinal teeth. Many years ago F. R. Latchford¹ tersely characterized these differences as follows: "In *U. radiatus* these are short, erect, and triangular. In *U. luteolus* they are long, curved, compressed, and oblique." The dull, rough epidermis is characteristic of *radiata* but, as noted in Oneida Lake specimens this may not be present or typically developed. It seems evident that in Oneida Lake evolutionary forces have been at work upon this group of the Naiades and that the form herein described as *oneidensis* is the result.

Figures 1 and 3 represent male, 2 and 4 female individuals.

My thanks are due Dr. Bryant Walker for assistance in working out the relationships of this race and also Dr. C. C. Adams, of the New York State College of Forestry, for the loan of the plate upon which the race is figured.

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DESCRIPTIONS OF NEW SPECIES FROM THE CRETACEOUS AND
TERTIARY OF THE TESLA, PLEASANTON, SAN JOSE, AND
MT. HAMILTON QUADRANGLES, CALIFORNIA.

BY E. B. HALL AND A. W. AMBROSE.

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PHOLADOMYA HARRIGANI, n. s. Hall and Ambrose.

Description. Shell, right angle, thick; beaks low, anterior, in-curved, nearly touching. Buccal end abruptly truncated at

¹ Notes on the Ottawa Unionidae. Trans. Ottawa Field Nat. Club, No. 3, page 51, 1882.

right angles to cardinal and basal margins. Cardinal margin regularly rounded anteriorly from beaks; anterior end rounded into straight basal margin; posterior end, anterior end and basal margin closed. Surface marked by prominent irregular lines of growth following curvature of shell and extending continuously along sides and on posterior end to umbones, also marked by 17 to 19 less prominent radiating, regularly spaced ribs that cover entire surface of sides and do not extend on to posterior end as in the case of the lines of growth. The radiating ribs become more prominent proceeding from the anterior to the posterior end.

Dimensions. Length, 50 mm. Posterior width, 40 mm. Posterior thickness, 35 mm. Greatest width and thickness at posterior end.

Notes. Named in honor of P. F. Harrigan, Los Angeles, Calif.

Type. Museum, Stanford University, Calif.

Locality. Black shale, Western Pacific Railroad cut near Altamont, Tesla Quadrangle.

Horizon. Upper Chico, upper Cretaceous.

SCHLOENBACHIA TEMPLETONI, n. s. Hall and Ambrose.

Description. Shell discoidal and compressed, slightly inflated on the last whorl, attains a diameter of 16 cm. Keel slight and broken into nodes. Surface ornamented with about 45 (counted along ventral margin) rounded, slightly curved, forward pointing ribs, that begin in narrow elongated nodes (slightly diverging from plane of keel) on the ventral margin and end on the umbilical margin in about a third as many pointed nodes as ribs, from which the umbilical walls make a perpendicular descent. Some of the ribs bifurcate on the surface of the shell in nodes without any apparent regularity of system and from three series of costal nodes on the surface—not counting the umbilical and ventral margin nodes—and run nearly regularly with the curvature of the whorl. The nodes on the ventral margin are opposite each other. The tubercles of the keel stand a little forward of the marginal nodes in a position to exactly meet the forward curving of the ribs.

Notes. Named in honor of E. C. Templeton, Stanford University, California.

Type. Museum, Stanford University, California.

Locality. Western Pacific Railroad cut between Altamont and Greenway, Tesla Quadrangle.

Horizon. Upper Chico shale, upper Cretaceous.

TEJON—UPPER EOCENE.

PANOPEA SMITHII, n. s. Hall and Ambrose.

Description. Shell subquadrate, about twice as long as wide; beaks small, nearly central but a little toward the posterior end. Cardinal margin nearly straight anteriorly with end regularly rounded, slightly sloping posteriorly with end abruptly truncated, basal margin slightly concave. Posterior end gaping, anterior end and basal margin closed. An angulated furrow runs from the umbones to posterior end of basal margin. A gently curved furrow runs from umbones to center of basal margin, giving a bulging appearance to both dorsal and ventral ends. Surface marked by coarse, rather regular ribs.

Dimensions. Length, 72 mm.; width, 37 mm., apparently from others found, this form represents the adult form.

Notes. Named in honor of Professor James Perrin Smith, to whom the authors are deeply indebted.

Type. Museum, Stanford University, California.

Locality. Creek cut opposite where Livermore road crosses the Western Pacific Railroad, Corral Hollow, Tesla Quadrangle.

Horizon. Tejon, Upper Eocene.

MONTEREY—LOWER MIOCENE.

MESODESMA PACIFICA, n. s. Hall and Ambrose.

Description. Right valve. Cast. Shell subtrigonal, inequilateral. Beak small. Posterior end truncate, at extremity making angle of 133° at beak between posterior dorsal margin and anterior dorsal margin, anterior margin straight, abruptly truncated at end, deep furrow cutting at angle of 25° to anterior dorsal margin from beak, gradually disappearing until obscure at center of valve.

Dimensions. Long. 40 mm.; alt. 22 mm.; diameter 4 mm.

Notes. This form is easily recognized by its shape and posterior truncation. Harold Hannibal has collected this form on Vancouver Island in the Sooke Formation (Oligocene). The writers had the opportunity of comparing the material with a specimen collected by Mr. Hannibal. It showed a strong hinge, a large resiliary pit, rather deep, and a thick shell, with concentric striation.

Type. Museum, Stanford University, Calif.

Localities. Monterey Sandstone, P. 282, on the Pleasanton Quadrangle, in Alameda Creek, $1\frac{1}{2}$ miles south of Mouth of Welch Creek, and one-fifth mile south of Calaveras Fault, Sunol, Calif.

Horizon. Monterey Sandstone, Lower Miocene.

MACTRA BEALI, n. s. Hall and Ambrose.

Description. Left valve. Shell trigonal, thin, slightly ventricose, inequilateral; umboes prominent; beaks not prominent, situated slightly posterior to middle of shell; anterior margin slightly curved upward, running to anterior extremity where it is sharply rounded; posterior margin practically straight, running to posterior extremity where it is angularly truncated; basal margin regularly curved; posterior and anterior margin make an angle of 105° at the beak; surface smooth.

Dimensions. Long. 44 mm.; lat. 34 mm.; diameter 9 mm.

Notes. It is very similar to an unnamed form found by Harold Hannibal in the Sooke formation (Oligocene) of the North Pacific coast. Named in honor of C. H. Beal, Stanford University, Calif.

Type. Museum, Stanford University, Calif.

Locality. Monterey Sandstones of Pleasanton Quadrangle. This particular valve came from locality P. 227.

Horizon. Monterey Sandstone, Lower Miocene.

BRIONES—MIDDLE MIOCENE.

OSTREA TITAN Conrad. VAR. PERRINI, n. var. Hall and Ambrose.

Description. Lower valve. Shell irregularly elliptical, contracted at beak; beak curved toward right when viewed from

exterior ; right valve very ventricose ; extremely laminated, giving rough plaited surface ; left valve almost flat, laminated ; muscle-scars distinct ; hinge long, narrowing at beak, viewed from interior curves to left ; cavity of hinge deep, coarsely wrinkled, with wrinkles running up onto either side of hinge ; interior of hinge ends abruptly, cutting at right angles toward interior of shell, although not characteristic of all forms.

Dimensions. Alt. 155 mm. ; long. maximum at base, 85 mm., minimum near beak 56 mm. ; diameter lower valve 61 mm.

Notes. This species greatly resembles *O. titan* Conrad, the main difference between the two being in the hinge. This variety has a long curved pointed hinge, while the *O. titan* has a much shorter hinge, about as wide as long. Also the summit of this variety does not rise above the beak of the opposite valve. All forms do not have as curved a hinge as this one figured. It is generally elongate, and seldom, if ever, has the subcircular shape the *O. titan* often has.

It is very abundant in the Briones, and may generally be found any place in the Briones on the Tesla, Pleasanton, Mt. Hamilton or San Jose Quadrangles. This particular specimen is slightly smaller than the ordinary *O. titan* var. *perrini*.

It is named in honor of Professor James Perrin Smith.

Type. Museum, Stanford University, Calif.

Locality. Briones of the Tesla, Pleasanton, San Jose and Mt. Hamilton Quadrangles, Calif.

Horizon. Briones, Middle Miocene.

MACOMA WILCOXI. Hall and Ambrose.

Description. Right valve ; shell thin, elongate, inequilateral ; surface smooth ; beaks, small, low, pointed, nearly medial, curved slightly toward posterior end ; anterior extremely regularly rounded ; posterior dorsal margin straight, sloping more steeply from beak than anterior dorsal margin toward extremity which is angulated at a point somewhat below the horizontal medial line of the valve ; base curved. Hinge unknown, interior inaccessible.

Dimensions. Long., 31 mm. ; lat., 18 mm. ; diameter, 5 mm.

Notes. The angular posterior extremity gives it a distinctive shape. It is named in honor of R. W. Wilcox, Delta, Colorado.

Type. Museum, Stanford University, California.

Locality. This specimen was found in Briones reef sandstones on the north limb of the Haywards Pass syncline. It is also found on the anticline northwest of Dublin, California. It is also found on the Tesla Quadrangle in the clays at the mouth of the small gulch joining Arroyo Seco from south, one-half mile above 963 Mark, Livermore, California.

Horizon. Briones, Middle Miocene.

PECTEN TOLMANI, n. s. Hall and Ambrose.

Description. Both valves convex, left more convex of two, inequilateral, base regularly rounded; margins smooth. Right valve with 16 to 18 prominent rounded ribs, separated by rounded interspaces, narrower than the ribs; ribs on left valve more prominent and irregularly spaced; surface sculptured by numerous, fine, imbricating, regular lines of growth; hinge line less than one-half length of disk; ears subequal; anterior ear of other specimens show 5 or 6 sharp radial lines emanating from beak, crossed by fine, faint, concentric lines; sculpture of posterior ear less distinct but truncated at right angles.

Dimensions. Alt. 67 mm.; long. 71 mm.; diameter 9 mm.; umbonal angle 130°.

Notes. This species resembles an enlarged *P. andersoni* but is undoubtedly a new form. This form is much larger than *P. andersoni*, the hinge (proportional to size) much shorter, and the umbonal angle much larger.

It is possible this form is a descendant of *P. andersoni*, of Monterey times. The young are very similar to *P. andersoni*, and it is not certain that the forms classified as *P. andersoni* in the Briones are not the young of *P. tolmani*. Named in honor of Prof. Cyrus Fisher Tolman, Jr.

Type. Museum, Stanford University, Calif.

Locality. Briones of Tesla, Pleasanton, San Jose and Mt. Hamilton Quadrangles.

Horizon. Brionet, Middle Miocene; probably Monterey, Lower Miocene.